

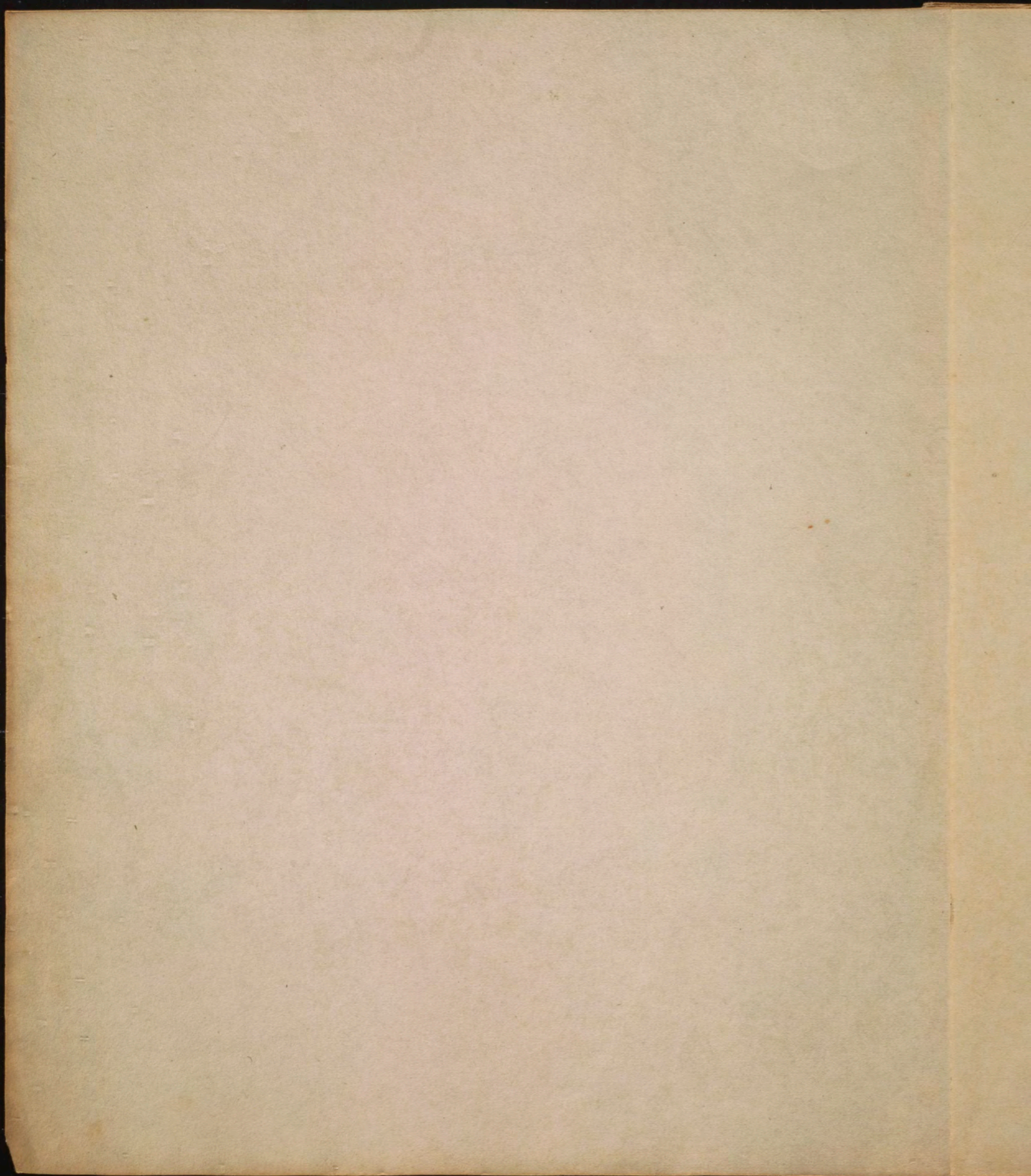
An
Essay, on

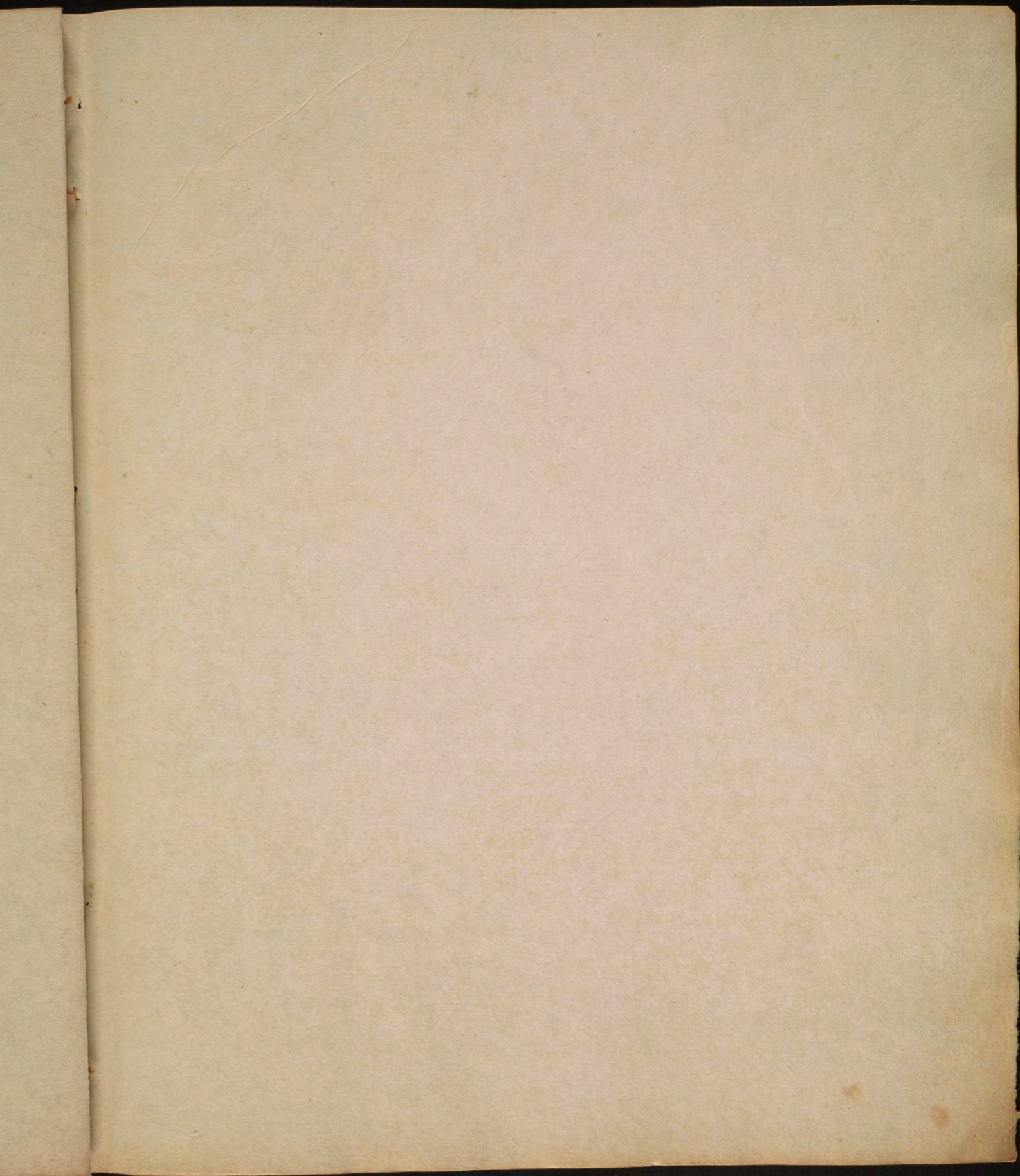
The Modus Operandi of Gold

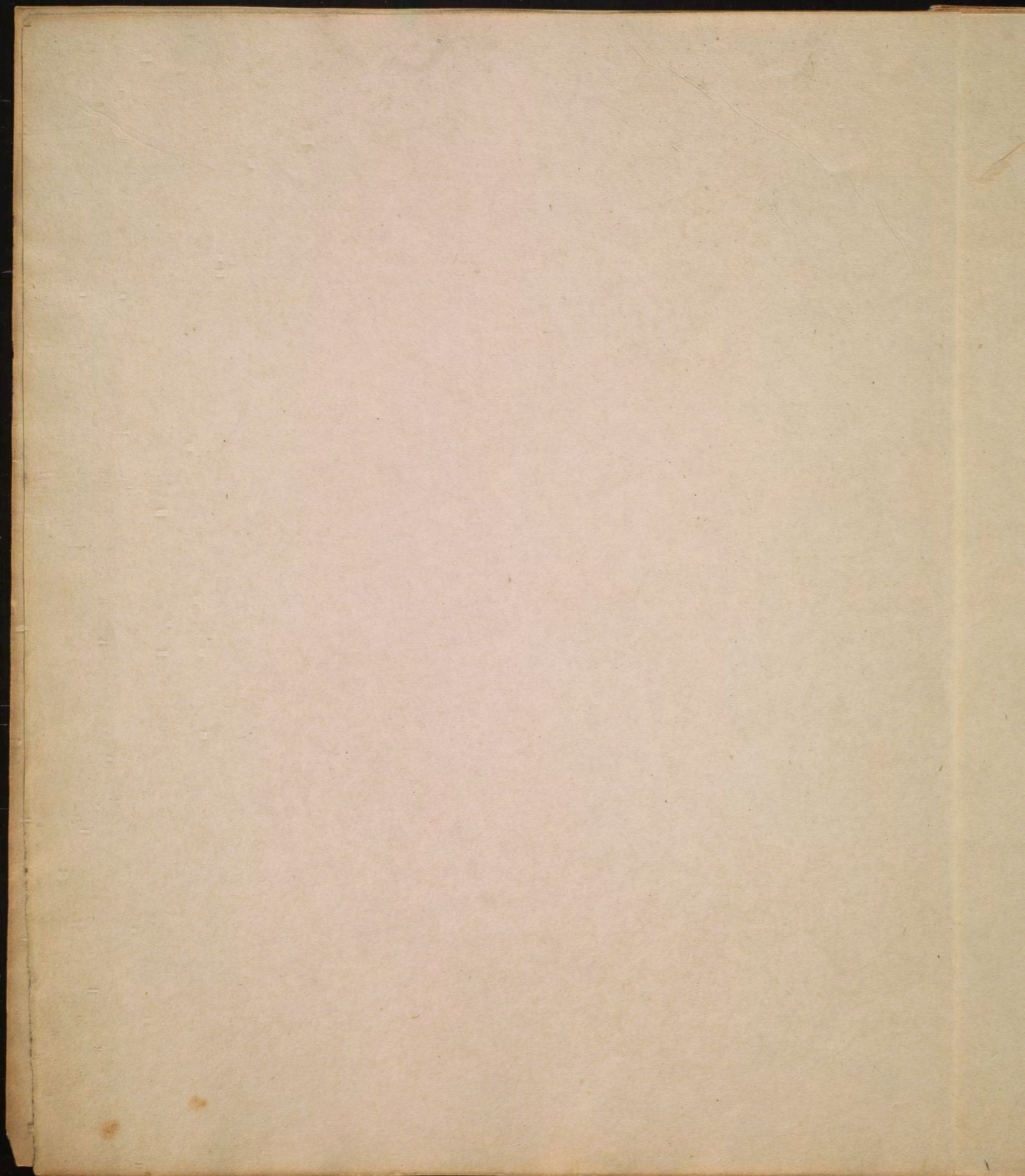
By
Samuel Merry
of Virginia

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We think our fathers fools, as now we grow;  
Our wisest sons, no doubt, will find us so.

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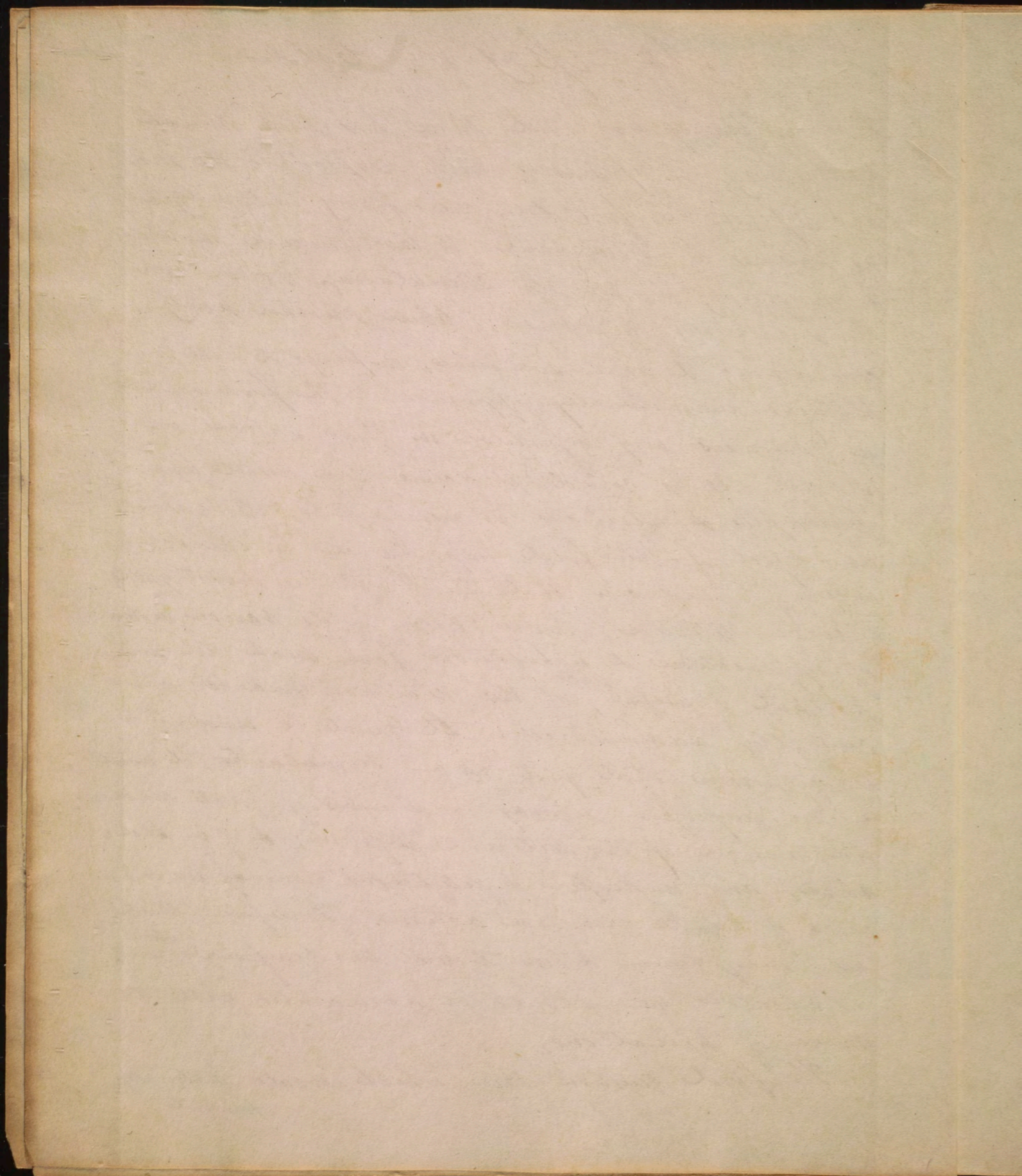


An Essay on Cold

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For a few years past, there has been much controversy in opinions with respect to the uses & purposes of Cold; one party believing that it acts as a stimulant to the animal machine, & prescribing it for its stimulating power in the Treatment of diseases; while another party, considering it as a sedative, employs it with intentions diametrically opposed to the former, & in Diseases very dissimilar in their natures or stages. As no correct Practice can result from principles & intentions so discordant, it becomes an object of the first importance in the Science of Medicine, that the Truth be investigated, & soon detected, since Cold in its various modes of application & exhibition forms such an important & useful ^{article} of the Materia Medica, when correctly administered. It must be evident to every person, that if it is a stimulant, it must be an improper remedy in diseases of great morbid action of the arterial system; & if a sedative, an improper & deleterious remedy in diseases of weak morbid action. Therefore that we may know when it will be beneficial, ^{when} and detrimental, we should be acquainted with its mode of Operation.

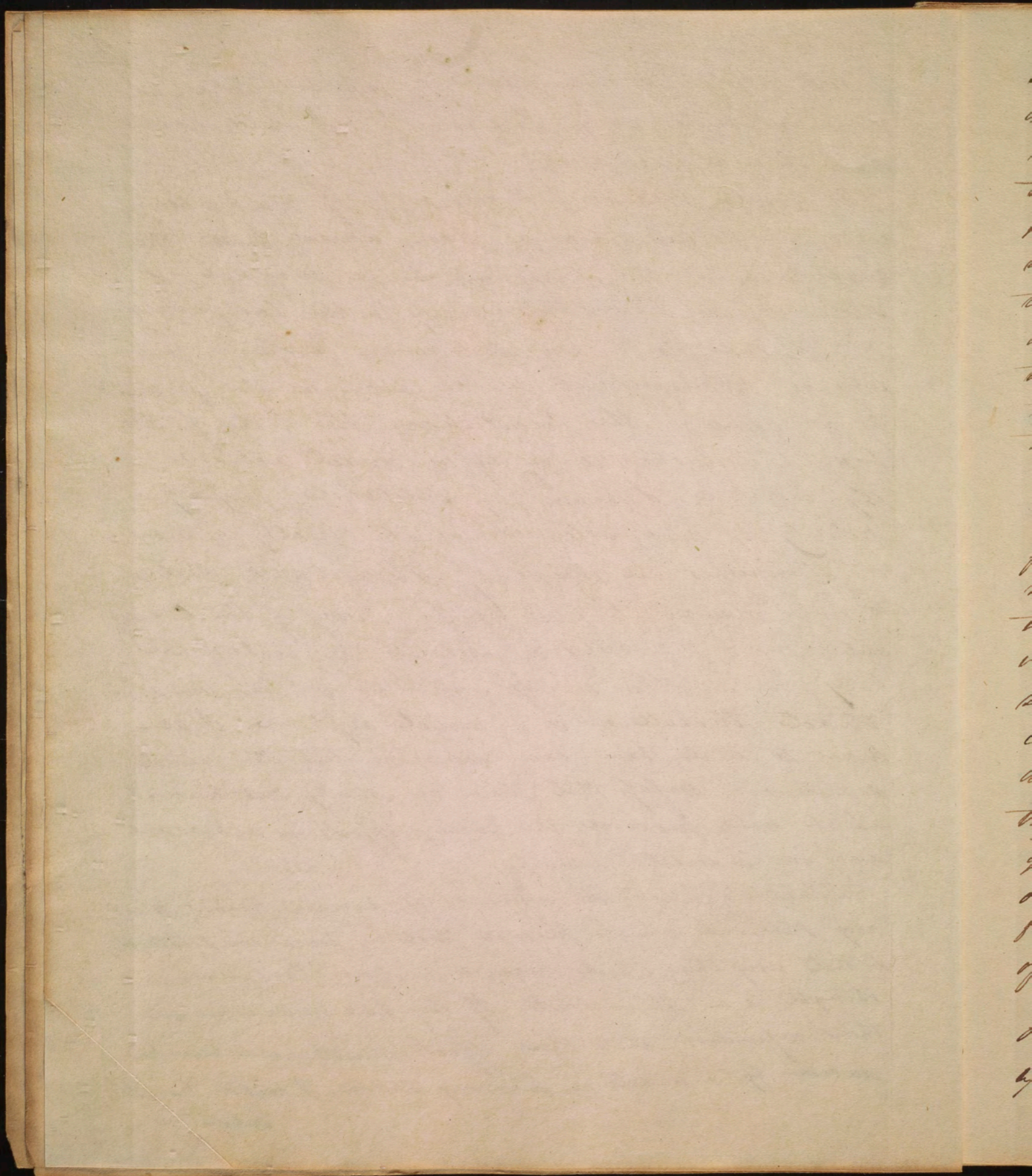
The first question then which would naturally present



present itself to our mind, is, whether Cold is a Stimulant or a Sedative? I shall answer that it is a Sedative.

As much Confusion, & difficulty of comprehending a writer's meaning, have arisen from the ambiguity of the terms which he may use, I shall define Stimulants nearly in the language of Dr. Barton, to be any substance, property, quality or Circumstance which increases the frequency & force of the Circulation, the heat of the body & nervous energy by a direct action. By Sedatives, I mean any substance, property, quality or Circumstance which directly reduces or diminishes the effects of Stimulants, that is to say, reduces the force & frequency of the Circulation & diminishes or abstracts the heat of the body; or in other words, any thing which can abstract Stimulus, or is a direct sedative. I allude to what have been denominated the direct sedatives & confess that there are many substances which will produce the above effects in a secondary or indirect manner.

Stimulants have been defined by several Authors to be any substance which produces Motion, Sensation & thought; & that every thing which produces Motion, Sensation, and thought, is a Stimulant. If they had included in their definition, that these effects must have been produced by a direct or primary action, I could have submitted

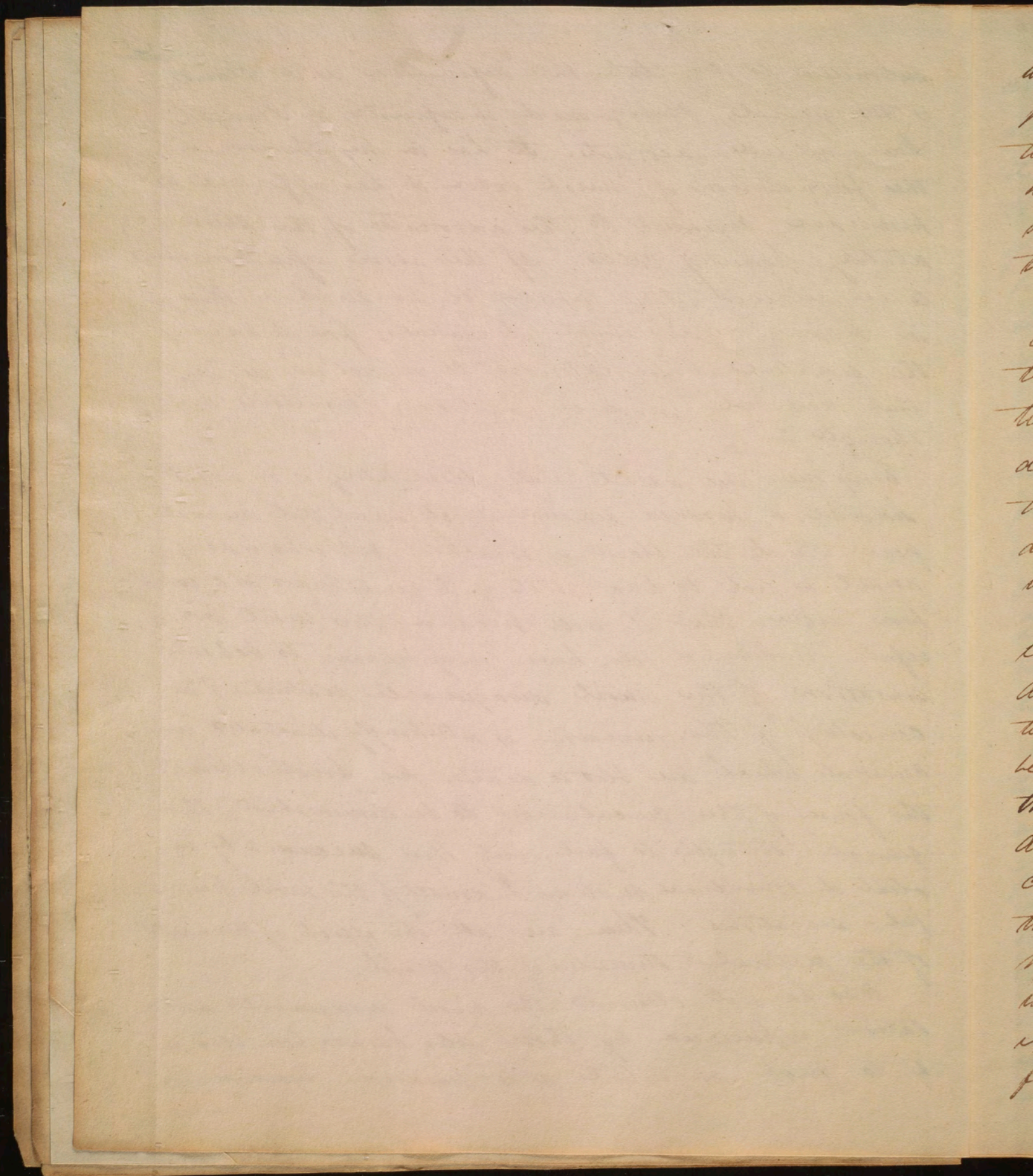


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submitted to it; but the definition as it stands, is too general, ambiguous & indefinite, & I might have added, incorrect. It has in my opinion, laid the foundation of much error & has afforded a principal argument to the advocates of the stimulating powers of cold. If the above definition were to be allowed, there would be no such a thing in nature as a direct sedative; for where is the sedative when it tends to a certain degree, that does not produce motion, sensation or thought?—

Every one will admit that blood letting is a direct sedative, & produces sedative effects upon that animal from which the blood is abstracted; but who is so ignorant as not to know that if it be extended to a certain degree, that it will produce the most powerful motion, & we have every reason to believe, sensation of the most disagreeable nature? The correctness of this remark is strikingly illustrated in animals which are bled to death. We first observe the force of the circulation to be diminished, the general strength to fail, but this succeeded by violent & convulsive motions & doubtless the most painful sensations. These are all the effects of the want of the natural stimulus of the blood.

Who has not observed the most disagreeable sensations experienced by those who have been bled on-
ly to such an extent as to produce syncope, or
who



who has not experienced themselves the most un-⁴
pleasant sensations, from the loss of such a quan-
tity of blood as to produce fainting? No one will
hesitate in saying, that the above motions & sen-
sations were not produced by the direct ac-
tion of a stimulant.

Again, if an animal be placed under the re-
ceiver of an air pump, & the air be exhaus-
ted, we shall observe the same effects as just men-
tioned from the loss of blood; yet no one will
deny that the atmospheric air is a stimulant
to the said animal, or that its abstraction or
diminution is a sedative or abductor of stim-
ulus.

The food which we daily receive, affords so
large portion of the stimulus necessary for the
animal economy;—it is certain that if the quan-
tity or quality of this be diminished, its effects must
be diminished in the same ratio, that is to say,
that abstinence is a depletor or sedative to the
animal system in reducing the force of the cir-
culation, the heat of the body &c. in proportion to
the degree of the abstinence. But if this absti-
nence be extended in degree or becomes what
we call, fasting, we shall find that a morbid
excitement will take place, the whole system
for a short time possessing preternatural strength,
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and accompanied with the most painful sensation. The pain of Hunger is so severe, that it is said to submit to no Laws, nor yield to no restraint. It is a familiar observation of Military Character, that the greatest cowards become brave men by fasting. The strength of the Lion is said to be much increased by hunger, & becomes more ferocious.

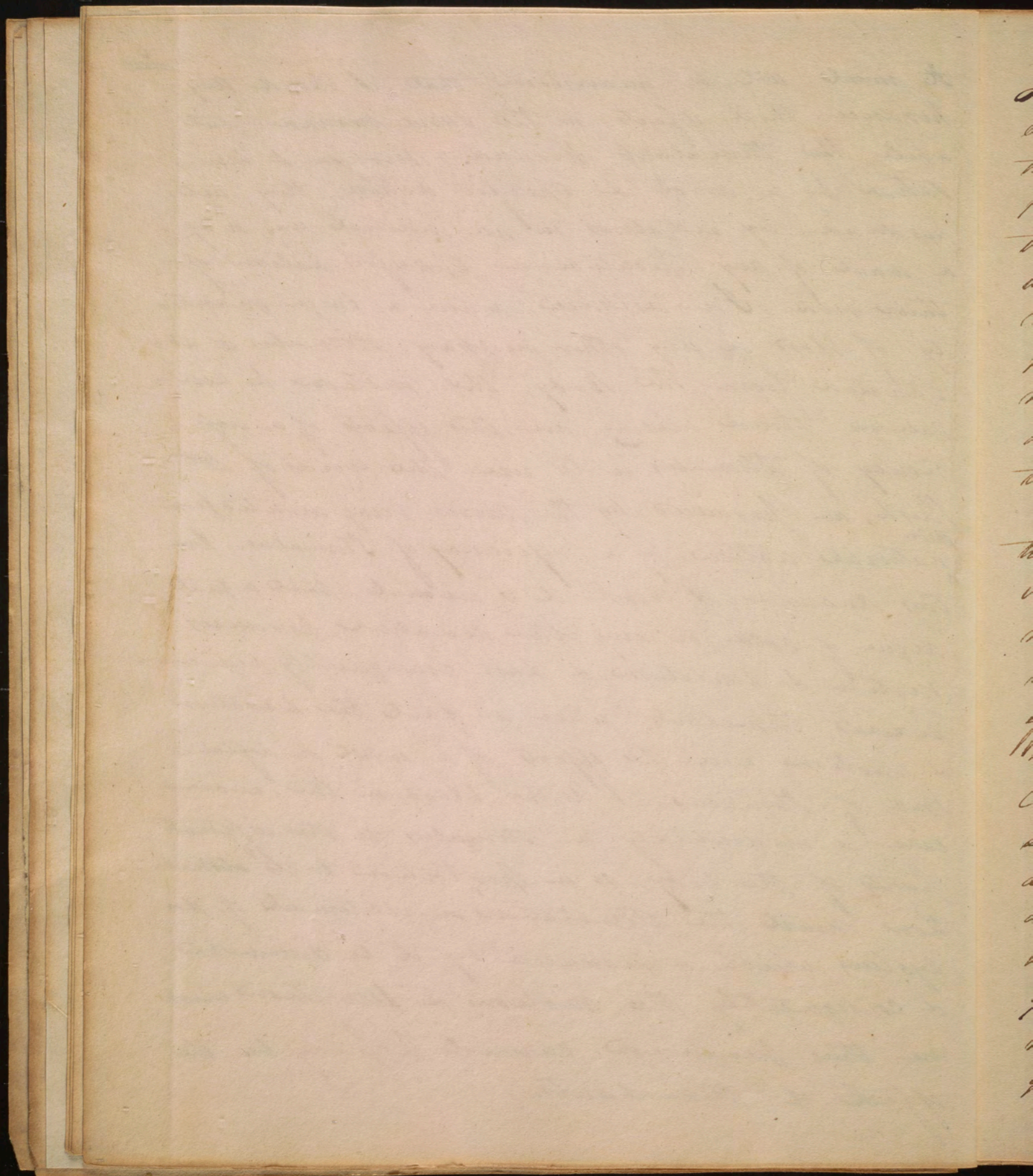
Is it not reasonable to conclude that the sensation & motion from the application of cold, are produced in this same manner from a deficiency of Stimulus, when we reflect that cold is only the absence or deficiency of heat, or a greater capacity for heat, & that heat itself is a stimulant? The same phenomena take place with respect to every other agent in nature if they be estimable for enough. —

From the above facts we see that motion & sensation are as much the effects of a deficiency of the natural & healthy quantity of Stimulus, as they are of the direct action of Stimulus. It would appear from hence, that the Animal Economy requires a certain proportion or quantity of Stimulation for the performance of its healthy operations, & that an excess or deficiency of Stimulus are equally detrimen-
tious, & equally productive of morbid actions.

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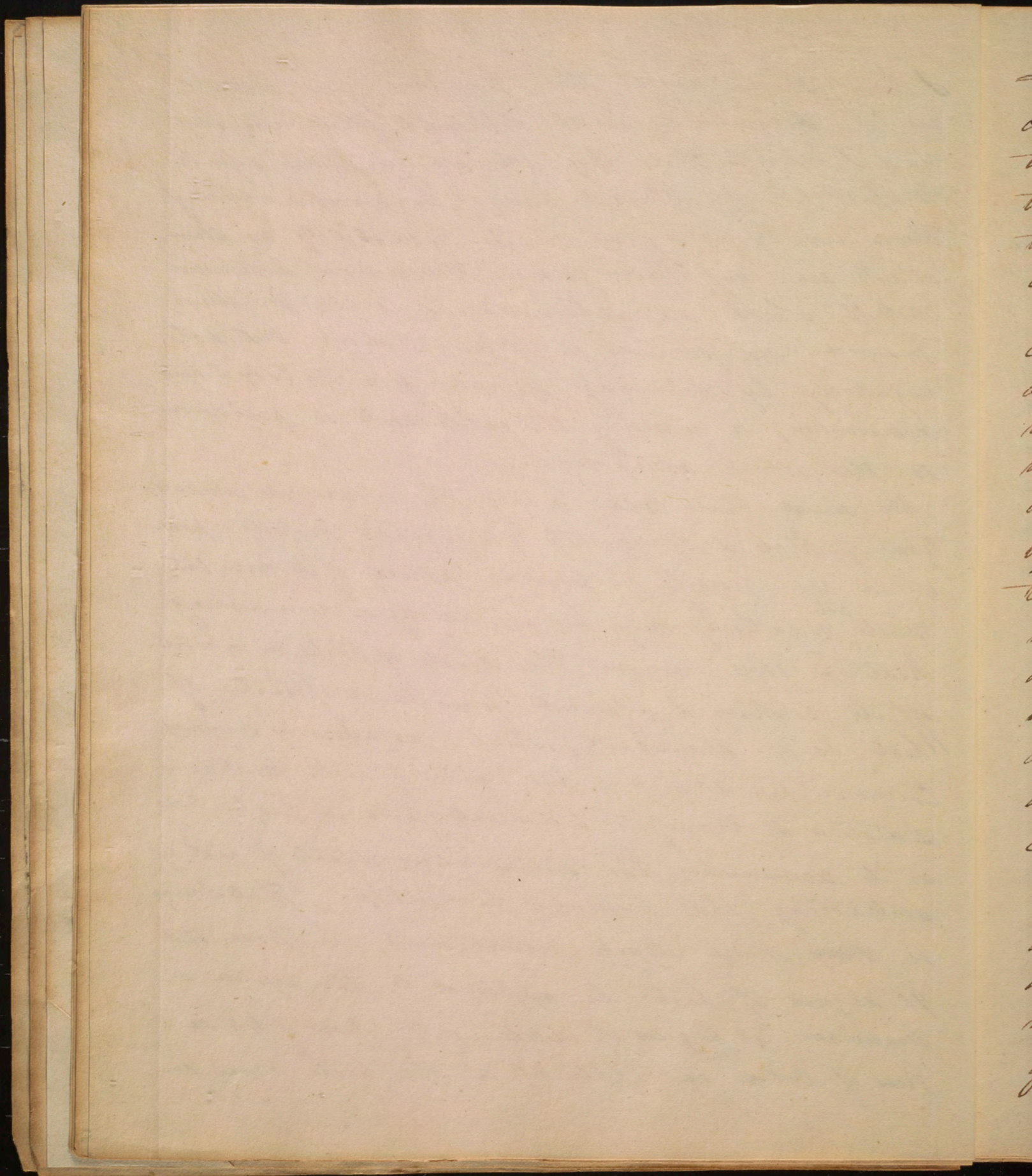
It must not be understood that I think they produce these effects in the same manner; but while the stimulants produce motion & sensation by a direct & specific action, they are produced by sedatives in an indirect way, or by a want of any peculiar & specific action of their own. For instance, when a large quantity of blood or any other necessary stimulus is abstracted from the Body, the motion & sensation thence arising are the effects of a deficiency of stimulus, or to use the words of Dr. Rush, are produced by the nerves being diverted from ^{their} natural action by a deficiency of stimulus. In this manner, I think it is evident, that a great degree of cold, or any other sedative, produces motion & sensation, & have consequently been considered stimulants, when in fact the sensation & motion were the effects of a want or deficiency of stimulus. As the blood in the above case is undoubtedly a stimulus to the different parts of the body, so in proportion to its abstraction must the stimulation or excitement of the system which is produced by it, be diminished, & consequently the motion & sensation which are thus produced, cannot possibly be the effect of stimulants.



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I have said above that sedatives were abstract-
ions of stimulus, or direct depletions, & shall now say
that I believe that they all are negative agents,
properties, or Qualities, & produce no specific action of
their own, by acting upon the excitability as stim-
ulants are supposed to do. Venisection, Abstinence,
rest &c, which are acknowledged to be sedatives,
produce no positive or Specific action, but act
negatively by abstracting stimulus from the body & thus
diminishing or reducing the excitement in proportion
to the above abstractions.

We know that cold is only the absence, or abstrac-
tion of heat, & consequently a negative property or pow-
er, & can possess no positive action of its own, but
must ^{act} negatively only, by abstracting or diminishing
heat, & thus remove the effects of heat, or exhibit
effects contrary & different from those of heat. If
heat be a stimulant, (which is admitted by everyone)
Cold or the absence or abstraction of heat, must be a
sedative, & manifest sedative effects in proportion
as it diminishes the stimulating effects of heat, by
abstracting the stimulus heat itself. That I may
be ~~more~~ more clearly understood, Suppose that
90 degrees of heat be applied to the system &
produce 40 degrees of excitement; Now if 45 de-
grees of Cold be applied, or the heat, more cor-
rectly



rectly speaking, be reduced 45 degrees, the excitement must be reduced in the same proportion, that is, to 20 degrees; & so in proportion to the reduction of the heat or the application of the Cold, will be the reduction of the excitement.

To obtain a correct knowledge of the operation of Cold, I think it would be sufficient only to take a view of vegetation in the winter & the spring. What causes the lifeless appearance of vegetation in winter, & what the lively verdure of Spring?—no one will pretend to say that the former is caused by the stimulating operation of Cold, or the latter by the sedative power of Heat. We daily see life excited in vegetables in its most perfect & vigorous state, by means of a stone room, or a warm house, in the winter season, when there are not the smallest symptoms of vegetation in similar plants which are exposed to the cold of the winter.

If the branch of a Tree should find its way into a stone room while the whole tree is in a vigorous & lively state with respect to growth & vegetation in the warm season, it will remain in this state for a considerable length of time after every other part of the Tree exhibits

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not a single sign of vegetation in consequence of the winter's cold. Or should this branch be introduced into a warm stove room in the midst of winter when there was not the smallest sign of vegetation in any part of the tree, we shall find that this branch will soon vegetate & become as green as it is in the midst of spring, while the rest of the tree which is still exposed to the cold, remains in the same condition in which it was previous to the introduction of the branch into the warm stove room. Likewise when vegetation is in a vigorous state in the midst of summer, if the temperature of the atmosphere be considerably diminished, the rapid growth of vegetables is immediately checked, & if the cold be continued for a short time, they will become pale & languid. This fact must be familiar to every one, & the cause must be as plain & as evident as the fact is familiar.

From the above facts, I think it is incontrovertibly proved, that cold cannot exert any stimulating power upon vegetables; but where is the line of distinction between vegetables & animals? I believe that Naturalists & Physiologists generally agree, that they possess the same kind of life, & that it differs only in degree or quantity. If
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This opinion be correct, the most natural & correct inference would be, that cold must exert a similar influence over animals as over vegetables, & consequently could not be a stimulant to animals, as it is unquestionably not to vegetables.

Let us next take notice of some of the effects of cold when applied to different insects & animals. Here we observe the same phenomena in the hibernating insects, animals, &c which take place with respect to vegetables in the different seasons. They possess life in its most perfect & active state in the warmer seasons, but gradually become more inactive & torpid as winter approaches, till not a symptom of life remains. If in this torpid & apparently lifeless state, they be exposed to moderate heat & this gradually increased, they will become reanimated, & in a short time possess life as active & as vigorous as they did before their state of hibernation. But if on the other hand, they be suddenly exposed to a great degree of heat, that life which they possessed in a latent state will certainly be destroyed. It is evident that the cold of the winter is the cause of this torpidity, & the summer heat is naturally the cause of the succeeding activity. Cold in producing this state

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of torpor, must either do it by exhausting the excitability by means of its excess of stimulating power & leaving the system in a nonexcitable or stictum state, or must act as a sedation by abstracting the necessary & natural stimulus of heat, & consequently excitement, & leaving the system in an excitable or laxum state. If it were in the former way, it is plain that it would require a large portion of stimulus, ^{to excite} it, or to convert into excitement the remaining small portion of excitability; but contrary to this, we know that if a great degree of heat be applied, we run a risk of destroying the life of the insect, toad, or animal to which it is applied.

A fact stated by Dr. Rush in the course of his Lectures goes far to prove that cold is not a stimulant to Horses; to wit, "It is ascertained by experiments & is a fact familiar to the Farmers of this Country, that a horse requires 8 pounds of Hay more in 24 hours in an open & cold stable in the winter, than he does in a stable that is close and warm. A certain quantity of stimulus is always necessary to be acting upon the system for its well being, & if cold were a stimulant, the more severe it was, the less food should be necessary to keep the system at its proper point of excitement.

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Do we not observe the same thing to take place in the Inhabitants of Cold & Northern climates? They use a larger quantity of the most stimulating animal food & spirituous & fermented liquors, than the Inhabitants of temperate & Southern climates. The same thing is observed in warm & temperate climates in the different seasons. As in proportion to the coldness of the season in warm climates, & the severity of the cold in northern climates, so we find our food & drinks more stimulating. Does this not arise from a deficiency of stimulus; & if cold was a stimulant, would not the quantity of stimulating food & drinks be necessarily diminished in the same ratio in which the intensity of the cold was increased?—

What is the cause of that difference of time which takes place in the appearance of the Catamenia in warm & Cold climates? We have every reason to believe that in proportion as the Female has been under the influence of stimulating Passions, conversations, food &c, and in proportion to the warmth of the climate, so much sooner do the Catamenia make their appearance. As every thing which excites repeatedly & uniformly the system, has a tendency in the same ratio to accelerate the appearance of the Catamenia, under similar circumstances

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- circumstances as to health, &c. In proportion to the degree of Cold in every Climate, (ceteris paribus) so are the Catamenia retarded in making their appearance. Should Cold then in this case be considered as a stimulant or a sedative? —

If the hand be exposed to cold for some time, or if a ball of snow or ice be applied to it, & if after a few minutes the hand then be suddenly exposed to a degree of heat which would have been comfortable before the application of the cold, a most excruciating & burning pain will be experienced. If the cold be increased, or its application longer continued, & the hand then be exposed to a greater degree of heat, besides the above mentioned symptoms, the part will be endangered of losing its life & sloughing off, or be increased by a great degree of inflammation. But if the hand thus exposed to cold, be plunged into cold water whose temperature is only a few degrees greater than that of the cold to which the hand has been exposed, & if the temperature then be gradually increased, the life of the part will then be saved, & the pain will be very trifling. It is evident that the excitability in this case is greatly accumulated, & that very gentle stimulants should be applied to prevent violent morbid action, or new prostration

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death from taking place; hence the treatment ¹⁴
in Frost bites. If Cold in the above case had acted
as a stimulant, the excitability would have been
exhausted instead of having been accumulated. The
pains of the limbs which is experienced from expo-
sing it to heat after a previous application of
snow or ice, appears to me to arise from a tem-
porary & local Rheumatism of the limbs. If cold
be a stimulant, how shall we account for the
frequency of Rheumatism, Pneumonia, Catarrh, &
other acute & inflammatory diseases in the winter &
Spring, or from sudden changes of the weather?
If the limbs be exposed for some time to such a
degree of heat as it can conveniently bear, & then
be suddenly plunged into cold water, we shall
have none of the symptoms as above mentioned, or
in a very small degree.

Suppose a person to be in a room whose tempera-
ture was of such a degree as to be most agreeable to
the person, to preserve the excitement at its natural
& healthy standard, & causing activity neither by action
nor abstraction; let the temperature of the room be gra-
dually reduced to such a degree that the life of the
patient should be lost by his freezing; what would be
the phenomena exhibited from the first reduction of
the temperature of the room, till the death of the
person? The natural excitement of the animal sys-
tem

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time would be reduced, the heat of the body diminished, & the whole vital energy finally exhausted. We shall find no increase of excitement through this whole course, not a solitary symptom of a preternatural quantity of stimulus acting upon the system. Suppose that after this cold has been considerably increased, it should be suddenly reduced or abstracted, what would then take place? - the excitability being accumulated by a deficiency of stimulus, the natural heat of the room would then act as a powerful stimulant, the pulse would become excited, the heat much increased, & the skin would assume the inflammatory blush.

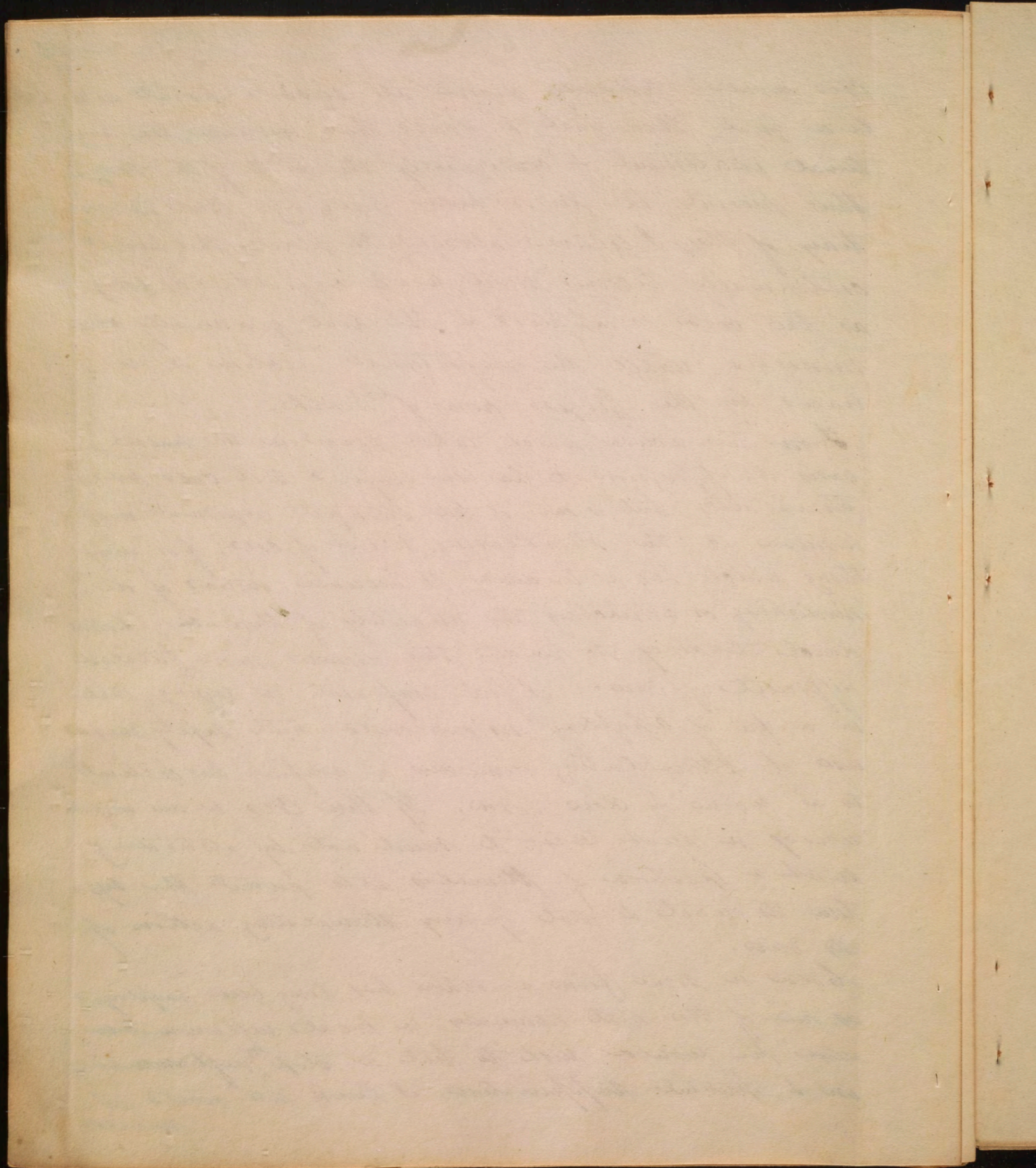
This must have been observed by every one in a left degree, who after exposing his face in walking to the wind in cold weather, suddenly turns his back to it, or enters a warm room. All stimulants (unless applied suddenly & excessive in quantity or quality, in which case immediate prostration or death may be produced) increase the force of the arterial system & heat of the body; but we know that cold produces the reverse of these effects, though it be increased from a very moderate to such a degree as to become extremely painful. This is proved by many experiments which have been made for that purpose, but which are needless for me to relate. If cold does really act as a stimulant primarily, I think it is difficult to conceive how any person could pass to death; before this could happen, the degree of cold

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Cold would certainly arrive at such a point as to be a great stimulant, & would then increase the arterial excitement & consequently the heat of the body & thus prevent the person from freezing. But the contrary of this, I believe always takes place, the pulse continually becomes more weak & feeble as long as the cold is applied & the heat gradually diminishes until the unfortunate victim is embraced by the frozen arms of Death.

From the action which takes place in the pulse in cases of apoplexy, it has been inferred that cold was a stimulant, but is one of the strongest arguments in opposition to the stimulating power of cold; for any thing which has a tendency to increase, instead of diminishing, or abstracting the quantity of stimulus, has a direct tendency to render this disease more fatal & difficult of cure. I feel confident in saying, that in a fit of apoplexy no one could with safety make use of stimulating remedies, or confine his patient to a warm & closed room. If then cold be an useful remedy in such cases, it must act by abstracting such a portion of stimulus as to permit the system to react & not by any stimulating action of its own.

Cold in some form or other has long been employed as one of the best remedies in local inflammation; when we would wish to stop ^{the} inflammation & prevent suppuration, I think we would not make

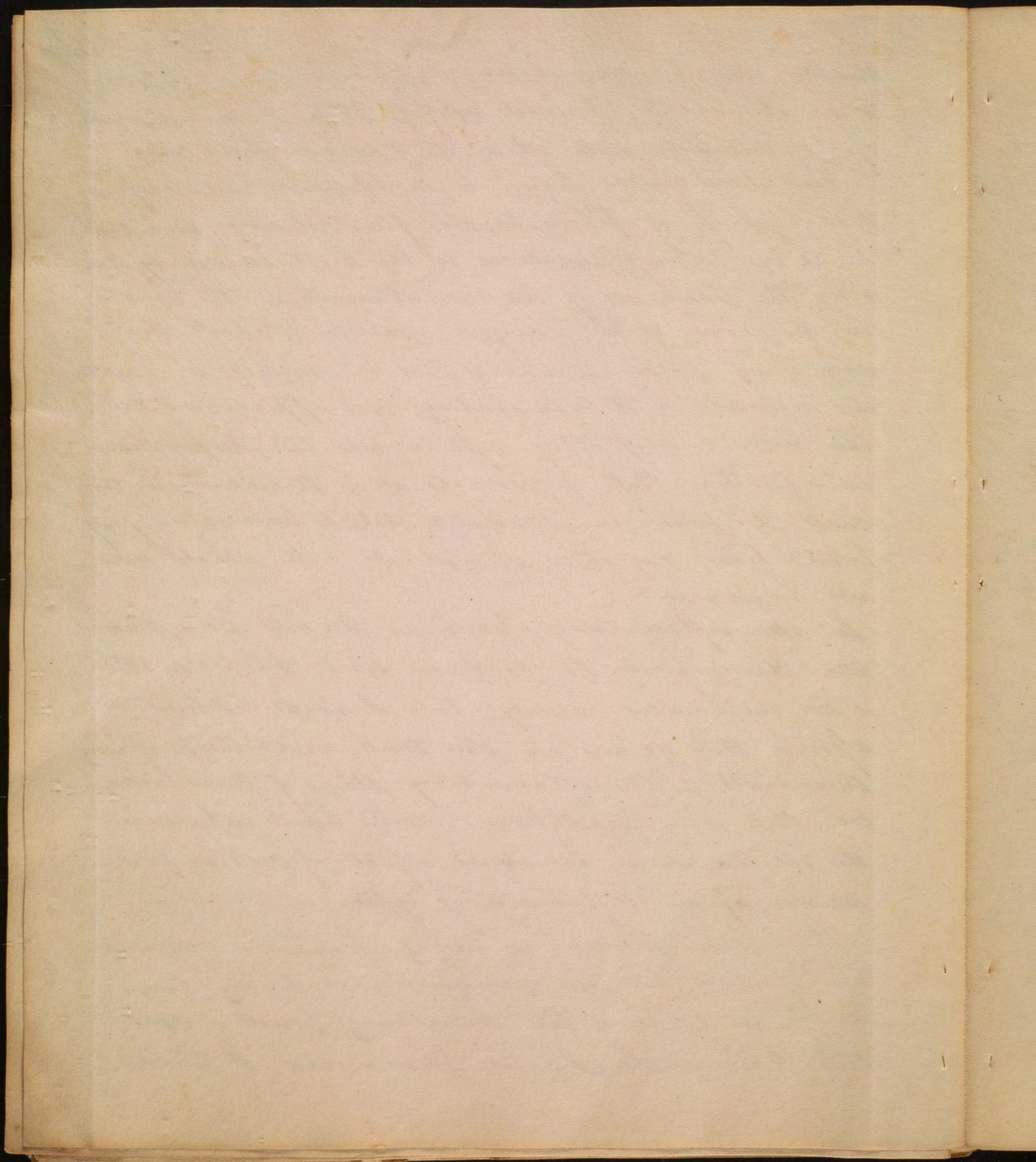


make use of stimulating applications. If Cold is a stimulant, I must confess that I am ignorant of the intention with which it is used in these cases.

The excruciating pain, high delirium, restlessness, & watchfulness of Phrenitis, are often relieved in a short time by Cold applications to the head, or even by shading the head, relief has been obtained;— it must be familiar to the youngest medical student, that every thing which stimulates has a tendency to increase this disease, & that bloodletting, Cold applications to the head, & every other depletion, are the proper remedies for it. But if Cold acts as a stimulant in this case, it must be admitted that it acts entirely different from any other stimulant with which we are acquainted.

In all inflammatory fevers, as Small Pox, measles, Rheumatism &c, Cold in some shape or other is an invaluable remedy; but I would venture to assert that no one at this time would think of using stimulants in the inflammatory stages of these diseases. But every practitioner must have experienced the beneficial & sedative effects of Cold in febrile diseases of an inflammatory type.

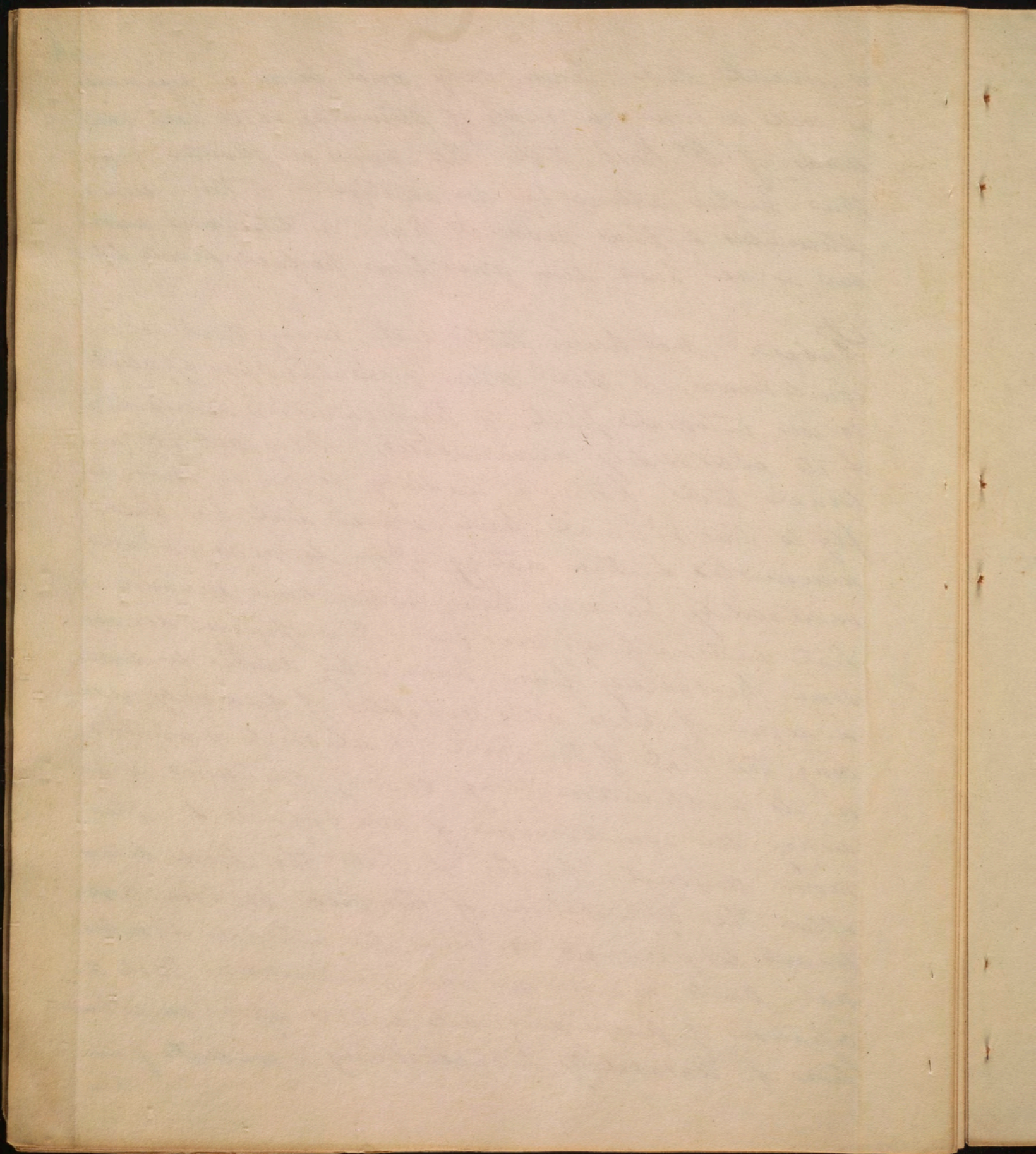
The pain produced or arising from the application of Cold, has been considered as a strong argument in favor of the stimulating power of Cold; but from what I have said above, I think it is



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is evident that pain may arise from a deficiency as well as from an excess of stimulus, or to use the words of Dr. Keib, that the nerves are diverted from their proper action by an abstraction of their proper stimulus & thus produce pain, in the same manner as we have seen arise from profuse bloodletting.

Quære. We know that heat always tends to an equilibrium, & that when cold has been applied to an external part, its temperature is diminished & its excitability accumulated; May not the internal heat having a tendency to an equilibrium, fly to this external part whose heat has been diminished, & then acting upon its accumulated excitability, produce pain in the same manner as heat externally applies?— This opinion arises some probability from pain being caused by such a degree of cold as is capable of suddenly reducing the heat of the part to which it is applied, or its application being so long continued as to destroy the equilibrium of the surface & the more internal parts; & that the pain ceases after the application of the cold has been continued long enough to bring the external & internal parts nearly on an equilibrium. That the cessation of pain does not depend upon an exhaustion of sensibility & excitability is evident from the



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The now & acute pain which is caused by approaching near a fire. This has been often noticed in cases of frost bites.

It is said that the flow of tears caused by the application of a ball of snow to the eye, is a proof of the stimulating power of cold. The pain arising from the snow, may for a short time cause a small increase of the secretion of the Tears; but as we know that the whole external surface of the body is contracted by cold, the mouths of those absorbents opening externally must partake of this general contraction, which together with that state of torpor which must arise from such an abstraction of their proper degree of stimulation, & consequently a smaller quantity of fluids must be absorbed. Thus the tears overflowing the Chunks is consequent of the contraction & inactivity of the *Puncta Lacrymalia*, gives the appearance of an augmented quantity of tears; but that this does not depend upon an increased secretion & action of the Lacrymal Glands, is inferred from all other Glands having their action retarded or diminished by Cold; instance the late menses in which the Catamenia make their appearance, & the small quantity secreted at a time in cold climates, - by experiments of Mr. Hunter it is found that digestion is retarded by Cold, - & the secretion of the Testicles is performed with less activity in

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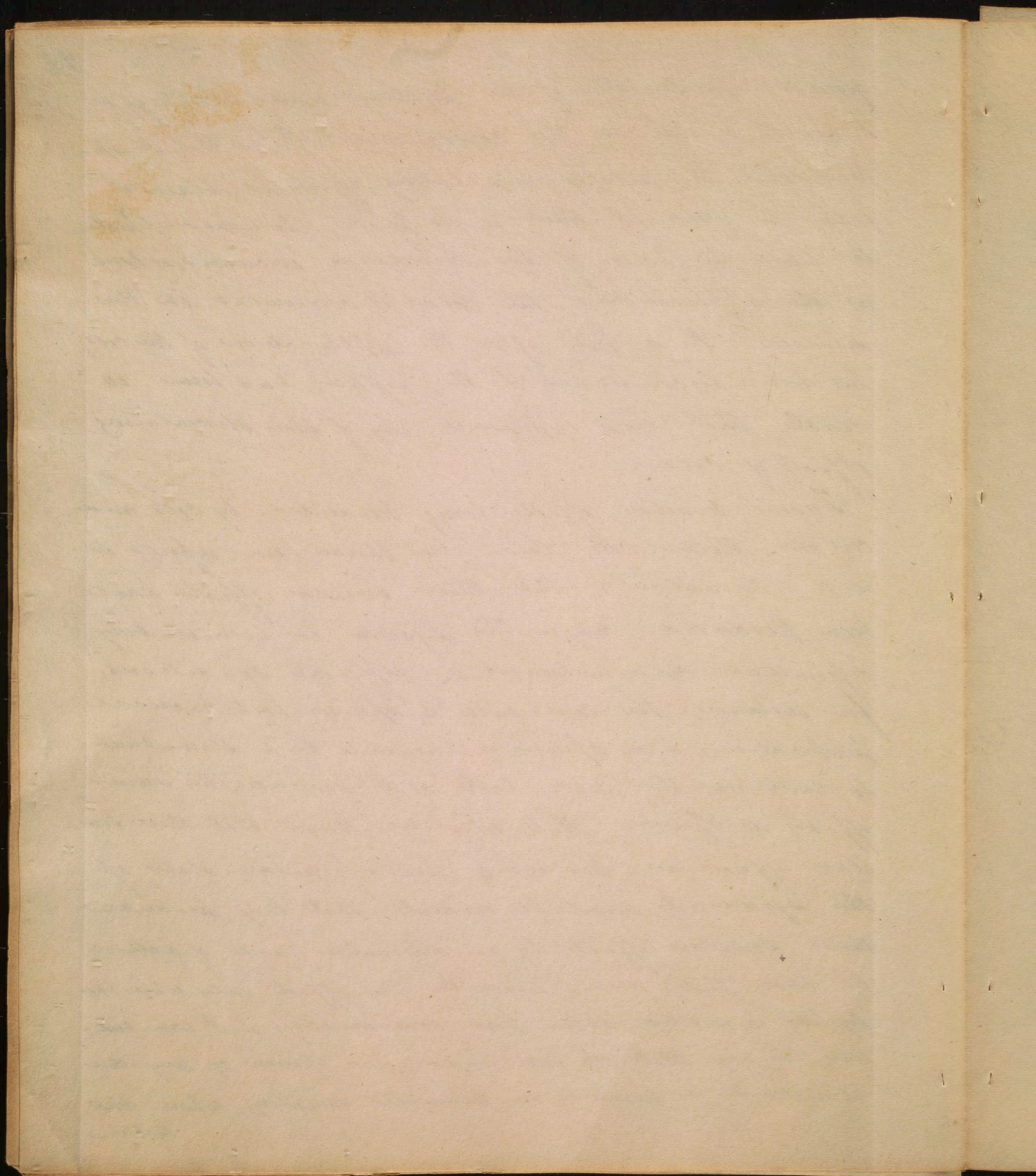
Cold weather. Cold, for a few years past, has been much used by several Physicians in Europe in Typhus Fever, & has afforded a strong argument as thought by some, of the stimulating power of Cold, but I think militates against the opinion which it was intended to support. In what state of Typhus fever is cold used, & in what manner is it employed? It has been thought most beneficial when the skin was hot & parched. It must be evident to every one that the dry & hot skin in this case must depend upon an increased & morbid excitement; now if this artitious excitement can be translated to the arterial system by a convulsive remedy, we shall obtain the same effects as by giving large doses of stimulants internally. With this intention cold water has been used, hence the necessity of the application of Cold being continued a very short time in typhus fever. If cold is a stimulant, why is cold water used only in the manner of affusion in Typhus fever? If it was a stimulant, would it not be better to let the patient bathe for an hour or two in a tub of Cold water, or if this method was inconvenient, to make cold applications to the extremities for some length of time, for we know that the most powerful stimulants are most useful in Typhus fever. If it be continued for a considerable time

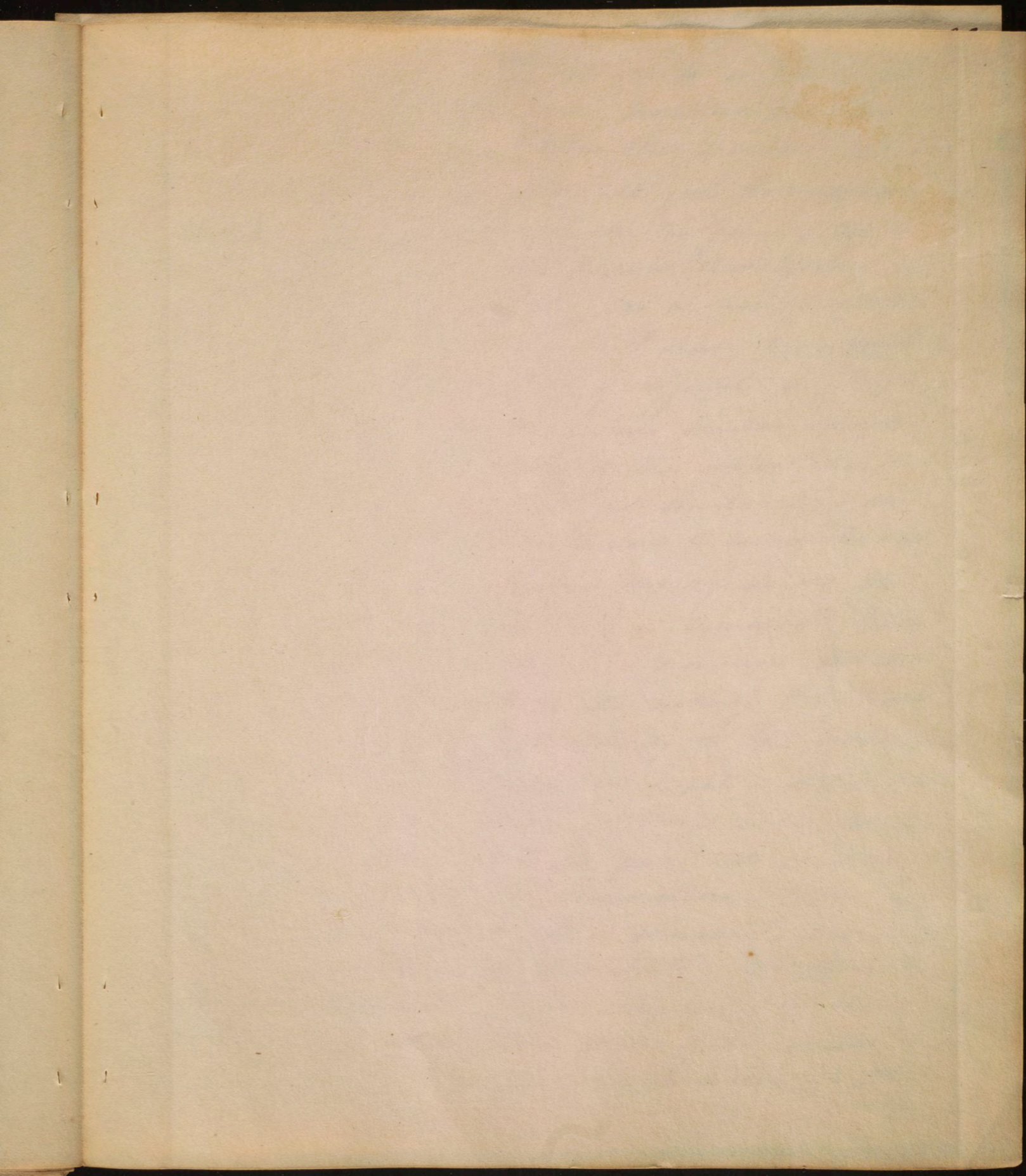
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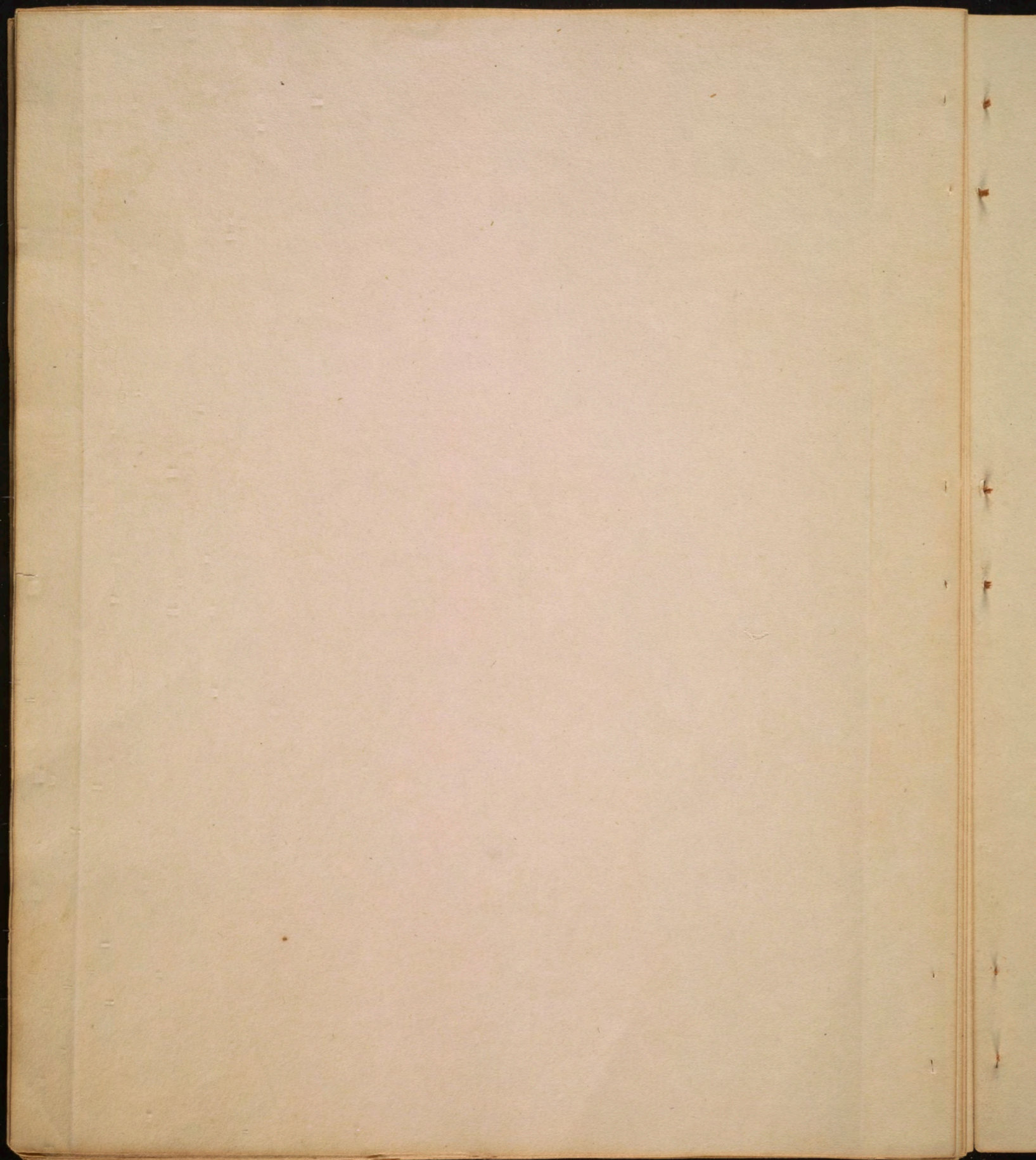
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general excitement of the system would be destroyed & death would be the consequence. From this it appears that no directly stimulating effect is obtained from the cold, & there is no person who would expect to find the force of the circulation increased, as long as the application of the cold is continued in this disease. It is only after the application of the cold has been discontinued & the system has time to react, that we experience any of the stimulating effects of cold.

From similar effects being produced by cold and certain stimulants, cold has therefore been inferred to be a stimulant; but these similar effects have been produced when the system has been in very dissimilar circumstances or different conditions; for instance, the cold bath & opium both increase perspiration, & as opium is known to be a stimulant so must be the cold bath as it produces the same effects as opium. But when we know that these similar effects are produced in dissimilar states of the system, it must be evident that they produce these similar effects by a dissimilar mode of action. We know that cold produces this effect only when the system is excited above par considerably; & I can venture to say that no one would give opium or any other stimulants to produce or promote sweating, when the system

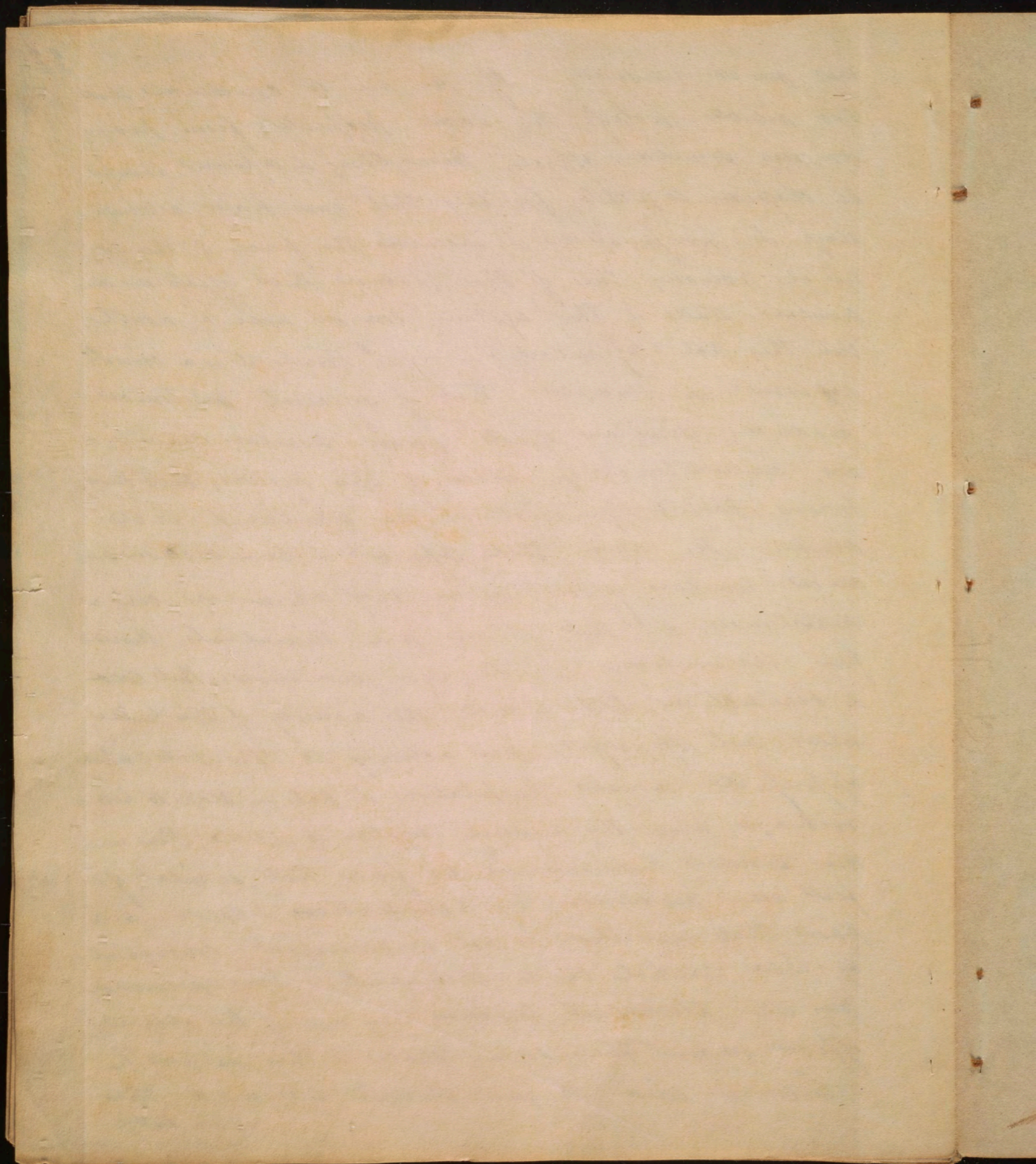






was much excited. If we are to conclude that two articles possess the same properties from producing similar effects, Blood letting & Opium should be clasped together, for they both ease pain, promote sleep & perspiration & increase the force of the arterial action; but if they produce these effects in dissimilar states of the system, can we have a doubt but they act dissimilarly? — I think it is a correct axiom in medicine, that if different substances produce similar effects under similar conditions, circumstances, or states of the system, that their powers, properties or qualities are similar, & vice versa. We know that Opium & venesection produce similar effects under very dissimilar circumstances, & that Opium is a stimulant, therefore venesection must be a sedative. But Cold & venesection both reduce the activity of the pulse when not oppressed, give activity to the pulse when oppressed, increase perspiration & put a stop to hemorrhages when the arterial system is excited; thus under similar circumstances we find that similar effects are produced by venesection & Cold. We know that venesection is not a stimulant, consequently by Cold cannot be a stimulant. Does Opium or any other stimulant produce any one of the above effects under the same state of the system?

Cold is said to give strength & vigor to the body;



body; does it, nor do it unless the system has been oppressed by heat? & does it not then do it only by attracting a portion of the superabundant stimulus of heat which debilitates the system & thus suffers it to react?—

The various accounts of the benefits derived from cold in the most inflammatory diseases, leave no room to doubt of the sedative power of cold. How do the advocates for the stimulating power of cold account for the beneficial effects of cold in these inflammatory diseases? They say, "when employed as a remedy in these diseases, cold through a direct stimulus to the skin to which it is applied, acts indirectly as a sedative to the internal system. First, it transfers to the skin somewhat on the principle of blistering plaster, a degree of excitement which that organ did not before possess: & secondly, it acts the part of an evacuant. For it is the genuine evacuant of heat of which there is a preternatural & morbid accumulation in the systems of those laboring under putrid & inflammatory diseases. Its evacuation, therefore, or removal from the system, must be attended with a sedative effect."

If the removal of the heat of the system be attended with sedative effects, must not whatever removes the heat be a sedative?—That in putrid & highly inflammatory fevers is a great irritant to the system, & though itself be the effect of the morbid action of the system, it becomes an irritant & keeps

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